NEW SPECIES OF *ELEUTHERODACTYLUS* OF COLOMBIA (AMPHIBIA: LEPTODACTYLIDAE)

II: FOUR SPECIES FROM THE CLOUD FORESTS OF THE WESTERN CORDILLERAS

By
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SUMARIO

Se describen las especies nuevas *Eleutherodactylus bernali, E. diaphonus, E. gracilis,* y *E. molybrignus* del grupo *unistrigatus*. Se encuentran estas especies en los bosques nublados de la Cordillera Central *(E. bernali* y *E. gracilis)* y la Cordillera Occidental *(E. diaphonus, E. gracilis* y *E. molybrignus)* de Colombia. En la actualidad, no tenemos evidencia suficiente para agrupar las cuatro como un subgrupo del grupo *unistrigatus*. Las cuatro especies son parecidas unas a otras pero las características son plesiomorfias o son características sin polaridad (en este momento).

Frogs of the genus *Eleutherodactylus* constitute a great part of the Colombian fauna. Following Frost (1985), there are approximately 430 species of frogs and toads known from Colombia (Cochran and Goin, 1970, had reported 212 species). In the neotropical region, the genus *Eleutherodactylus* is dominant in humid zones. This genus has more than 400 described species (Frost, 1985) of which 94 are recorded for Colombia (following Frost). In addition, there are 14 species described by Lynch (1984), Lynch and Ruiz (1985), and Rivero (1984) or recently found in Colombia *(E. anatipes, E. lythrodes,* and *E. sulcatus)*[2]. The predominance of *Eleutherodactylus* in the Colombian fauna (almost 25% of the species of frogs and toads) is a recent comprehension. Actually, we are aware of no more than two-thirds the true diversity of Colombian anurans.

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At the beginning of this century, 26 of the 108 species of *Eleutherodactylus* known from Colombia had been described but only eight were known at that time from Colombia. The Instituto de Ciencias Naturales was founded in 1936.

At that time, 42 of the 108 species had been described an 18 species were known from Colombia (all of these because the type-localities were Colombian). Cochran and Goin (1970) recorded only 33 species of *Eleutherodactylus* from Colombia (at least in part because they confused many species).

Although the lowland wet forests harbor many species of frogs (for example, in the Chocó or in Amazonas), the actual diversity of the cloud forests is much higher because there is a marked geographic substitution (or replacement) in a region that is topographically complex. At present, the majority of undescribed species are species of the cloud forests (between 1000 and 3000 meters). In the present paper, I describe new species from the cloud forests of the western cordilleras of Colombia.

METHODS AND MATERIALS

See Lynch (1980) for methods. The specimens reported herein are identified in the text by their catalogue number and an abbreviation for the collection. The abbreviations are: AMNH (American Museum of Natural History, New York), ICN (Museo de Historia Natural, Instituto de Ciencias Naturales, Universidad Nacional de Colombia), and KU (Museum of Natural History, The University of Kansas, Lawrence). Other abbreviations used in the text are: E-N (eye to nostril distance), HW (head width), IOD (interorbital distance), and SVL (snout-vent length).

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[2] The first report of *E. anatipes* from Colombia is KU 144984-86 from the Río Michenque (probably Río Mechengue), Municipio de El Tambo, Depto. del Cauca, 800 m. *Eleutherodactylus lythrodes* is known in Colombia from KU 153289 from Puerto Nariño, Comisaría del Amazonas. The records of *E. sulcatus* from Colombia are OPM (field number of Oscar Pinto) 563 from the Parque Nacional de Amaca-Yacu, Comisaría del Amazonas, ICN 3462, from approximately 50 km N La Chorrera, on the Río Igará-Paraná, Comisaría del Amazonas, and INDERENA (provisional number in the collection of the Instituto Nacional de los Recursos Naturales Renovables y del Ambiente), 637 from Timbio, Comisaría del Vaupés.

DESCRIPTIONS AND TAXONOMY

Eleutherodactylus bernali sp. nov. Figs. 1 (a-b), 2 (a), 3(a)

HOLOTYPE: Adult male, ICN (colección batracológica) Nº 4845, one of a series obtained by Pablo Bernal and Pedro M. Ruiz on 15 August 1978.

PARATYPES: ICN Nos. 4844, 4846-48, collected with the holotype. ICN nos. 10013-14, 1.4 km S junction of Sonsón-Dorada and Argelia roads, Municipio de Sonsón, Departamento de Antioquia, Colombia, 2350 m.

ETIMOLOGY: This species is named for don Pablo Bernal, former assistant and collector in the Museo de Historia Natural.

DIAGNOSIS: (1) skin of dorsum feebly granular, that of venter coarsely areolate; no dorsolateral folds; (2) tympanum reduced in size, concealed beneath skin; (3) snout short, round in dorsal view, feebly protruding in profile; canthus rostralis concave; (4) IOD wider than upper eyelid; no cranial crests; (5) vomerine odontophores prominent, oval; (6) males lacking vocal sac and slits, lacking nuptial pads; (7) first finger shorter than second; digital pads large; (8) fingers bearing lateral fringes; (9) no ulnar tubercles; (10) no tubercles on heel or outer edge of tarsus; short, flap-like inner tarsal fold; (11) two metatarsal tubercles, inner elongate, at least six times size of round outer; some supernumerary plantar tubercles present; (12) toes bear lateral fringes, basal webbing; (13) pale to dark brown above with indefinite pattern, venter cream with gray mottling; posterior surfaces of thighs gray; (14) 4 adult males 21.3-31.2 mm SVL.

Eleutherodactylus bernali is most similar to *E. gracilis* but differs in having a vestigal tympanum (absent in *E. gracilis*), more pronounced webbing of the toes, and because *E. bernali* lacks yellow or orange spots on the posterior surfaces of the thighs.

DESCRIPTION: Head as wide as body, wider than long; snout round in dorsal view, feebly protruding in lateral profile (Fig. 1); snout short; nostrils protuberant, near tip of snout, directed dorsolaterally; canthus rostralis not sharp but evident, concave; loreal region weakly concave, sloping to lip; lips weakly flared; interorbital region broad, flat; no cranial crests; frontoparietal fontanelle covered by bone; numerous small, non-pungen tubercles on upper eyelid; supratympanic fold thick; tympanic annulus reduced in size, completely concealed beneath skin; postrictal tubercles conical; choanae round, not concealed by palatal shelf of maxillary arch; vomerine odontophores elevated, oval in outline, posterior and median to choanae, separated by a distance equal 1/3 to 1/2 an odontophore width; each odontophore slightly larger than a choana, bearing a tranverse row of 7-8 teeth; tongue round, its posterior border not notched, posterior 1/3 to 2/5 not adherent to floor of mouth; no vocal sac or slits in males.

Skin of dorsum feebly granular (bearing small warts), warts most distinct on lower back; skin of head shagreened, that on flanks more coarse; no dorsolateral folds; skin on upper surfaces of limbs like that on lower back; anal opening not extended in sheath; skin of venter coarsely areolate, of throat smooth to feebly areolate; discoidal folds poorly expressed; skin below vent coarsely areolate; forearms robust; no ulnar tubercles; two palmar tubercles, inner largest, each smaller than oval thenar tubercle; keel along outer edge of palm; fingers bear prominent lateral fringes; supernumerary palmar tubercles prominent; subarticular tubercles round, moderately elevated; each finger bears disc; discs broader than long on fingers II-IV, as long as broad on I, apically rounded; pads large on II-IV, small on I; II longer than I (when adpressed equally); no nuptial pad in males but base of thumb swollen.

Knee, heel, and outer edge of tarsus lacking tubercles; a flap-like inner tarsal fold on distal 1/3 of inner edge of tarsus (Fig. 2); inner metatarsal tubercle three times as long as wide; outer metatarsal round, minute; supernumerary plantar tubercles at bases of toes II-IV; subarticular tubercles low, longer than wide; toes bear prominent fringes and basal webbing (Fig. 2); webbing formula I2^{+} — 2^{+} (2 — 2^{-}) — 3 III (2 3/4 — 3^{-}) — 4^{+} IV (3 3/4 — 4^{-}) — (2 1/2 — 2 2/3) V; toe pads smaller than those of outer fingers but large with broad discs; heels overlap when flexed hind limbs are held at right angles to sagittal plane.

In preservatives, dorsum cream to brown, bearing orange-brown to black and brown markings, *viz.*, interorbital bar, scapular W, sacral chevron, suprainguinal bar, canthal-supratympanic stripe, labial bars and slanted flank bars; anal triangle vague; three bars on forearm, three on thigh, four on shank; bars transverse and equal in width to interspaces; groin, anterior and posterior surfaces of thighs, and undersides of shanks dark gray; venter cream with pale gray mottling.

Dimensions of holotype in millimeters: SVL 29.0; shank 15.4; HW 10.6; head length 8.9; upper eyelid width 2.2; IOD 2.7; eye length 3.5; E-N 3.1.

Proportions (in percents): ♂♂ (N = 4) Shank/SVL 51.6-54.9 ($\bar{X}$ = 53.6); HW/SVL 36.6-40.8 ($\bar{X}$ = 38.1); upper eyelid/IOD 76.9-82.8 ($\bar{X}$ = 79.6); E-N/eye 77.5-88.6 ($\bar{X}$ = 84.0). ♀♀ (N = 3) Shank/SVL 53.4-54.7 ($\bar{X}$ = 54.0); HW/SVL 37.8-40.1 ($\bar{X}$ 39.1); eyelid/IOD 75.0-100.0 ($\bar{X}$ = 87.4); E-N/eye 79.5-87.1 ($\bar{X}$ = 83.3). The females are inmature and have SVLs of 23.2-30.9 mm. Natural history: The topotypes were found during the day beneath rocks along the sides of a stream. ICN 10013-14 were found at night in a steep-walled covered stream (not exposed to open sky). The frogs were sitting on leaves of plants growing on the rocky walls of the stream bed.

Eleutherodactylus diaphonus sp. nov. Figs. 1 (c-d), 2 (b), 3 (b), 4 (a)

Holotype: Adult male, KU (herpetological collection) Nº 168852, one of a series collected by Linda Trueb on 13 September 1974.

Paratypes: KU 168853-82, topotypes; ICN 13352, km 32, carretera Buga-Buenaventura, 12.6 km down a sideroad toward the campamento de Río Bravo (CVC), Municipio de Restrepo, Departamento Valle del Cauca, Colombia, ca. 1250 m.

Type-locality: Río Calima, 1.5 km W Lago Calima, Departamento Valle del Cauca, Colombia, 1230 m.

Etymology: The specific epithet is Greek, meaning discordant, and is used in reference to the toe webbing.

Diagnosis: (1) skin of dorsum pustulate, that of venter coarsely areolate; no dorsolateral folds; (2) tympanum reduced in size, concealed beneath skin; (3) snout short, round in dorsal view, acutely rounded in profile; canthus rostralis round; (4) IOD broader than upper eyelid; cranial crests present; (5) vomerine odontophores prominent, triangular in outline; (6) males with vocal sac and slits; thumb bearing white nuptial pad; (7) first finger shorter than second; digital pads large; (8) fingers bear lateral fringes; (9) no ulnar tubercles; (10) no tubercles on heel or outer edge of tarsus; short, indistinct inner tarsal fold; (11) one oval inner metatarsal tubercle; no supernumerary plantar tubercles; (12) toes bear lateral fringes, toes one-half webbed; (13) brown above with indefinite darker brown markings, venter cream with brown reticulation; posterior surfaces of thighs brown; (14) adult males 24.5-31.5 ($\overline{X} = 28.7$, $N = 13$) mm, females 38.0-41.5 ($\overline{X} = 39.8$, $N = 10$) mm SVL.

Eleutherodactylus diaphonus is most easily distinguished from its congeners by virtue of its toe webbing (Fig. 2). At present, it appears most similar to, albeit easily distinguished from, *E. bernali* and *E. gracilis* (Fig. 3). Among the species of the *unistrigatus* group, only *E. pugnax* has prominent toe webbing but that species is smaller, has warty skin on the dorsum, two metatarsal tubercles, and lacks a tympanum (Lynch and Duellman, 1980).

Description: Head broader than body (males) to as broad as body (adult females), wider than long; snout round or feebly ovoid in dorsal view, acutely rounded in lateral profile; nostrils protuberant, directed dorsolaterally; canthus rostralis rounded; loreal region concave, sloping gradually to lips;

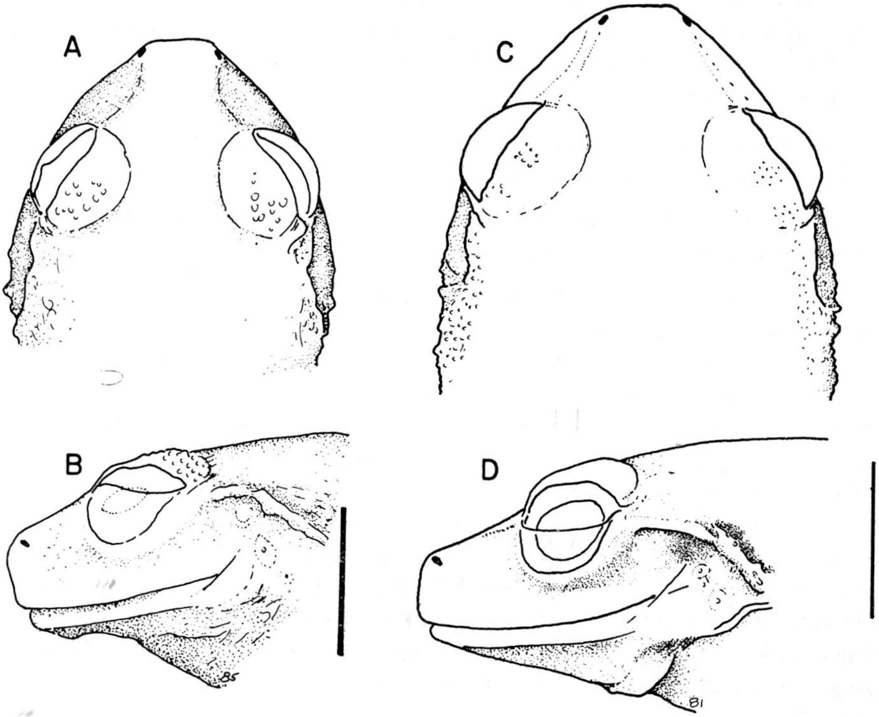

FIGURE 1. Heads of *Eleutherodactylus:* (A-B) *E. bernali,* ICN 4848, and (C-D) *E. diaphonus,* KU 168858. Scales are equal to 5 mm.

lips flared; upper eyelid narrow; interorbital region concave (cranial crests palpable); supratympanic fold sharp, bearing conical or subconical tubercles, ending above forearm; tympanum reduced in size, completely concealed beneath skin; postrictal tubercles conical (Fig. 1); choanae relatively large, oval, completely visible when roof of mouth is viewed from directly above; vomerine odontophores median and posterior to choanae, subtriangular in outline, elevated, separated on the midline by a distance equal an odontophore width, each bearing 3-4 teeth in a transverse row across posterior edge of odontophore, each about one-half size of a choana; tongue as long as wide or longer than wide, its posterior border feebly notched, posterior 1/4-1/5 not adherent to floor of mouth; a subgular vocal sac and vocal slits in males; vocal slits posterolateral to tongue.

Dorsal surfaces bearing dense fine granulations or pustules, no dorsolateral folds; skin of throat and venter areolate; discoidal folds well anteriad to groin; anal opening not extended in sheath; dorsal surfaces of digital pads and of foot (excepting toe V and distal phalanges of toe IV) smooth; ulnar tubercles not evident; palmar tubercle flat, bifid, larger than oval thenar tubercle; no supernumerary palmar tubercles unless one is evident proximal to finger IV; subarticular tubercles round, flat; fingers bearing thick lateral fringes; fingers bearing pads, those on inner two fingers round, on III and IV more truncate (Fig. 4); all pads bearing broad discs; first finger shorter than second; dorsal surface of thumb of male bearing glandular nuptial pad.

No tubercles on knee, heel, or tarsus; a short, indistinct fold inmediately proximal to inner metatarsal tubercle; inner metatarsal tubercle two to two and one-half times as long as wide; no outer metatarsal tubercle evident in most examples (in some, a faint pale area in the region where such a tubercle is normally found in other eleutherodactyline frogs); no supernumerary plantar tubercles; subarticular tubercles round (to slightly longer than wide), more pungent than those of fingers; toe webbing (Fig. 2) formula I 1 — 2^- II 1 — 3 III 2^+ — 3^- IV 3^- — 2^+ V; unwebbed portions of toes bearing flap-like fringes (including outer edges of toes I and V); no fringe along outer edge of foot; toe pads bearing discs, slightly smaller than those of fingers.

Eleutherodactylus diaphonus has two color morphs. The most common is brown above with dark brown markings (edges of interorbital bar, vague occipital W, sacral chevron, limb bars); canthal-supratympanic stripe and labial bars evident but ill-defined; brown flecks are scattered on dorsum and flanks, not forming a pattern but obliterating the pattern outlined above; limb bars tranverse, as wide as interspaces; venter cream with brown reticulation (pale across belly) becoming dense toward breast and on throat; throat brown with cream spots; undersides of limbs brown with small cream flecks;

groin, anterior and posterior surfaces of thighs deep, rich brown. The less common morph (Fig. 3) has a pair of cream stripes from the tip of the snout, along the edge of the canthus and upper eyelid, then broadening and extending to above vent; pale stripes edged with dark brown (as stripe-like edging); flanks marbled brown and cream.

In life, *E. diaphonus* is dull brown to dull olive above with black mottling; if dorsolateral stripes are present, they are tan; flanks and upper surfaces of limbs dull olive with dark brown mottling; posterior surfaces of thighs dark brown; venter gray; throat streaked creamy yellow and brown; iris dull brown.

DIMENSIONS OF HOLOTYPE IN MILLIMETERS: SVL 30.3; shank 16.6; HW 11.4; head length 9.9; upper eyelid width 2.6; IOD 3.0; eye length 4.3; E-N 3.1. The holotype exhibits the striped morph.

PROPORTIONS (AS PERCENTS): ♂♂ (N = 13) Shank/SVL 53.1-59.8 ($\overline{X}$ = 56.2); HW/SVL 37.1-39.6 ($\overline{X}$ = 38.6); upper eyelid/IOD 62.5-86.7 ($\overline{X}$ = 72.9); E-N/eye 71.4-87.1 ($\overline{X}$ = 72.1). ♀♀ (N = 10) Shank/SVL 51.1-56.4 ($\overline{X}$ = 55.2); HW/SVL 39.6-42.2 ($\overline{X}$ = 40.8); upper eyelid/IOD 62.5-85.4 ($\overline{X}$ = 72.3); E-N/eye 74.1-95.8 ($\overline{X}$ = 84.2).

NATURAL HISTORY: *E. diaphonus* is known only from two collections made at essentially the same locality. The frogs are found at night upon vegetation at the side of streams and rivers (several were found on leaves overhanging the river). In the sample of 14 males, 13 appear to be adult. There is one (KU 168866), apparently juvenile male (22.7 mm SVL) which does not have nuptial pads but does have vocal slits. Among the females (19 in sample), juvenile females range in size from 19.0 to 33.2 mm SVL. In juvenile females, the oviducts are thin and straight and the eggs are small (less than one millimeter in diameter). One female (ICN 13352) had deposited her eggs (she was collected in November). The other females, collected in September, are gravid.

Eleutherodactylus gracilis sp. nov. Figs. 2 (c), 3 (c), 4 (b), 5 (a-b)

HOLOTYPE: Adult female, ICN Nº 7872, one of a series collected by Humberto Carvajal and John D. Lynch on 4 July 1979.

PARATYPES: ICN 7873-89, collected with the holotype, KU 132657, 132706-07, 6 kms ESE Villamaría, Departamento de Caldas, 2130 m, KU 132708-11, 10-12 kms ESE Villamaría, Departamento de Caldas, 2100 m, AMNH 104198-204, 5½-6 km by road SE Villamaría, Departamento de Caldas, 2320 m.

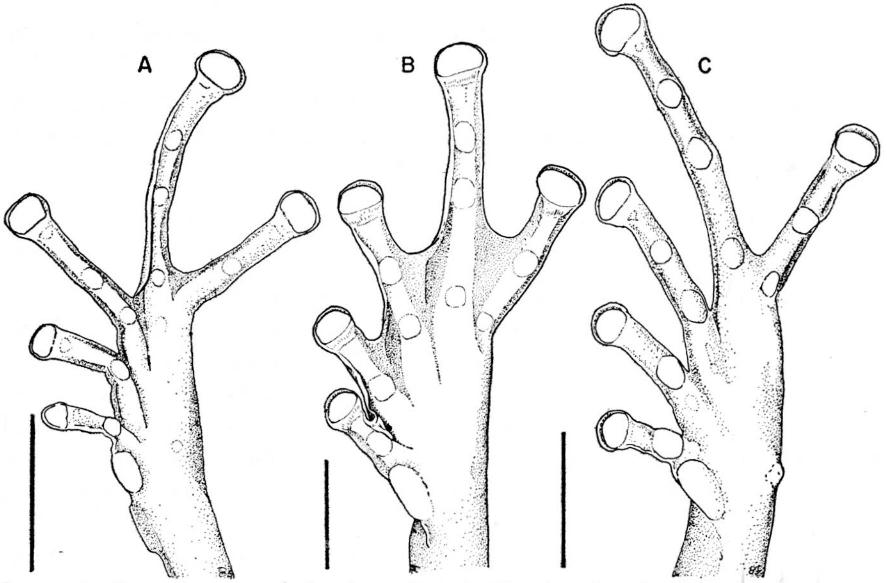

FIGURE 2. Ventral views of the feet of (A) *Eleutherodactylus bernali,* ICN 4848, (B) *E. diaphonus,* KU 168873, and (C) *E. gracilis,* ICN 7884. Scales equal 5 mm.

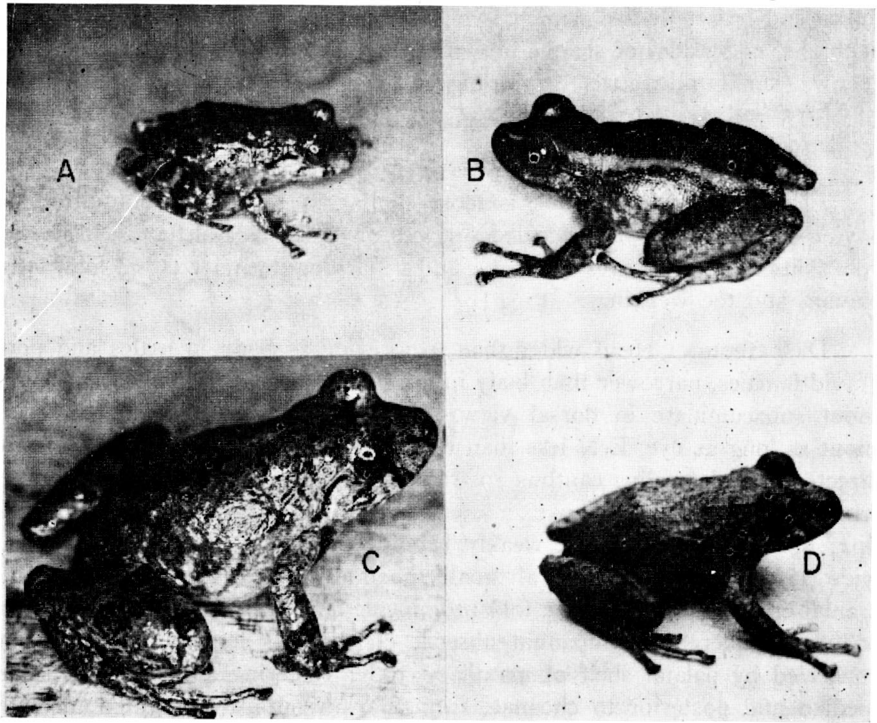

FIGURE 3. Photographs of *Eleutherodactylus.* (A) *E. bernali,* ICN 10013 juvenile female, 23.2 mm SVL; (B) *E. diaphonus,* KU 168852, male, holotype, 30.3 mm SVL; (C) *E. gracilis,* ICN 9085, adult female, 38.2 mm SVL, and (D) *E. molibrignus,* ICN 7902, adult female, 37.0 mm SVL. The photograph of *E. diaphonus* is courtesy of W. E. Duellman.

TYPE-LOCALITY: Peñas Blancas, ca 6 km by road SW Pichindé, Farallones de Cali, Municipio de Cali, Departamento del Valle del Cauca, Colombia, 1900 m.

ETYMOLOGY: The specific epithet is Latin, meaning slender, in reference to the longer, more slender legs of this species contrasted with *E. diaphonus*.

DIAGNOSIS: (1) skin of dorsum smooth with low postorbital ridges, that of venter areolate; no dorsolateral folds; (2) tympanum absent; (3) snout short, subacuminate in dorsal view, round in lateral profile; canthus rostralis evident but not sharp; (4) IOD as wide as upper eyelid; no cranial crests; (5) vomerine odontophores prominent, triangular in outline; (6) males with vocal slits, internal vocal sac; thumbs of males with non-spinous nuptial pads; (7) first finger shorter than second; digital pads large; (8) fingers bear narrow lateral fringes; (9) no ulnar tubercles; (10) no tubercles or folds on heel or tarsus; (11) two metatarsal tubercles, inner elongate, outer minute; supernumerary plantar tubercles indistinct; (12) toes bear lateral fringes, not webbed; (13) brown above with darker markings; venter cream; throat and breast flecked with brown; flanks, anterior and posterior surfaces of thighs, undersides of shanks brown with cream spots; in life, cream spots yellow (small individuals) to orange (large females); (14) adult males 24.9-30.5 ($\bar{X} = 27.9$, $N = 5$) mm, adult females 36.7-43.9 ($\bar{X} = 40.2$, $N = 12$) mm SVL.

Eleutherodactylus gracilis is most similar to *E. bernali* but differs in having pale spots on the concealed surfaces of the limbs and flanks, in having vocal slits and larger eyes (Fig. 3), and in lacking an inner tarsal fold, tympanum, and toe webbing.

DESCRIPTION: Head wider than to as wide as body in males and nongravid females, narrower than body in gravid females; head wider than long; snout subacuminate in dorsal view, rounded in lateral profile (Fig. 5); snout as long as eye, E-N less than eye length; nostrils weakly protuberant, directed dorsolaterally; canthus rostralis well-marked but not sharp (somewhat swollen), weakly convex; loreal region concave, sloping abruptly to lips; lips not flared, except weakly behind eyes (Fig. 5); upper eyelid as wide as IOD, bearing several small tubercles; interorbital space flat, no cranial crests; supratympanic fold prominent, bordered below by two conical postrictal tubercles; tympanum absent; choanae moderate-sized, oval, not concealed by palatal shelf of maxillary arch; vomerine odontophores large, median and posterior to choanae, triangular in outline, separated medially by a distance less than one-half an odontophore width, each larger than a choana, bearing a row of 3-6 teeth in a transverse series across posterior edge of odontophore; tongue longer than wide, its posterior edge feebly

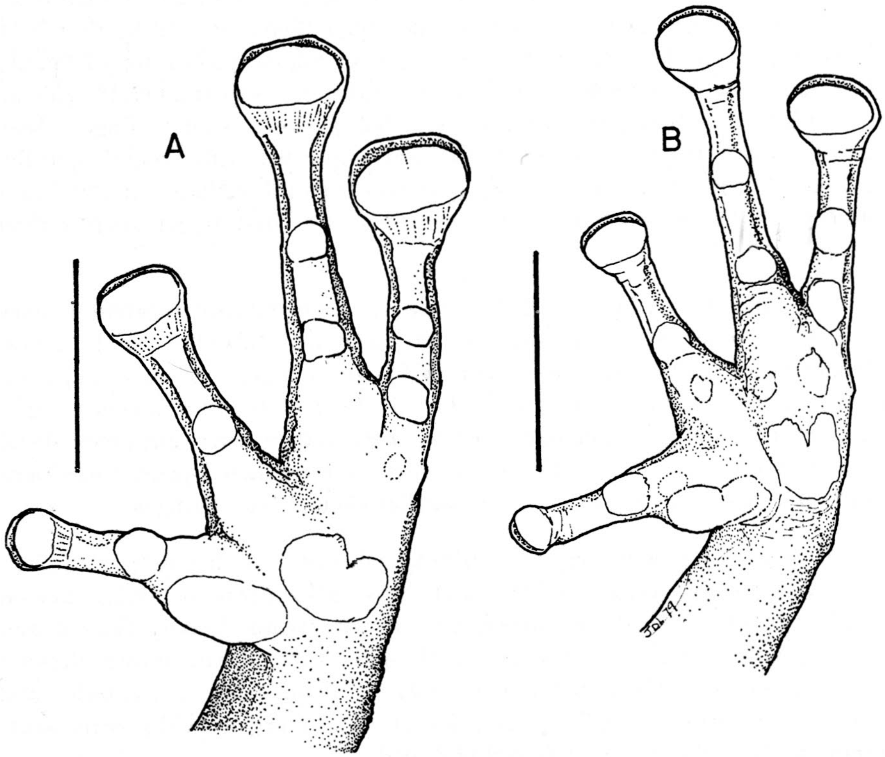

FIGURE 4. Ventral view of hand of (A) *Eleutherodactylus diaphonus,* KU 168873, and (B) *E. gracilis,* KU 132709. Scales equal 5 mm.

notched, posterior ⅕ (or less) not adherent to floor of mouth; males with short vocal slits lateral to tongue; vocal sac internal.

Skin of dorsum nearly smooth but bearing low postorbital ridges and low ridges on flanks; no anal sheath; skin below and ventrolateral to anus coarsely areolate, that on venter, lowermost flanks, and throat areolate; discoidal folds well anteriad to groin.

No ulnar tubercles or folds; palmar tubercle flat, bifid, larger than oval, flat thenar tubercle in females but smaller than thenar in males; thumb of males greatly swollen, bearing large non-spinous nuptial pad on top of thumb, glandular texture extending onto thenar tubercle; supernumerary palmar tubercles flat; subarticular tubercles low but pungent, round; fingers bear narrow lateral fringes; fingers II-IV bear expanded pads, round apically, and broad discs (broader than long) on their ventral surfaces; thumb bears similar disc but pad scarcely developed (Fig. 4); first finger shorter than second.

No tubercles on knee, heel, or tarsus; inner metatarsal tubercle 3 times as long as wide, not compressed; outer metatarsal tubercle round to oval (length twice width), low, less than 1/10 size of inner; indistinct supernumerary plantar tubercles at bases of toes II-V; toes bear prominent fringes, not webbed; most subarticular tubercles longer than wide, pungent; distal subarticular tubercle of toe IV round; toes bear expanded pads, round apically, and broad discs; pads of toes smaller than those of fingers.

Brown above with darker marbling (difficult to delineate); canthal-supratympanic stripes, labial bars, limb bars dark brown to black; bars on shanks oblique, as wide as interspaces; throat cream, heavily flecked and mottled with brown; venter cream with slight to moderate brown flecking (much less intense than on throat or breast); flanks (Fig. 3), anterior and posterior surfaces of thighs, undersides of shanks brown with cream spots (spots as large as or larger than thumb pad).

In life, *E. gracilis* is dark gray to brown above with diffuse dark brown markings; concealed surfaces of limbs and flanks black with orange (large females) to yellow (smaller individuals) spots; inner digits washed with green in juveniles; throat brown; venter and undersides of limbs dirty yellow washed with green and blotched with brown; iris chocolate brown with bronze flecks or reticulation.

DIMENSIONS OF HOLOTYPE IN MILLIMETERS: SVL 42.6; shank 22.4; HW 16.3; head length 14.9; upper eyelid width 4.3; IOD 4.3; eye length 5.3; E-N 4.7.

Proportion (as percents): ♂♂ (N = 5) Shank/SVL 49.3-53.8 ($\overline{X}$ = 51.0); HW/SVL 35.8-38.6 ($\overline{X}$ = 37.0); eyelid/IOD 100.0-138.9 ($\overline{X}$ = 115.3); E-N/eye 67.4-79.4 ($\overline{X}$ = 73.9). ♀♀ (N = 12) Shank/SVL 50.6-54.7 ($\overline{X}$ = 53.0); HW/SVL 36.9-38.8 ($\overline{X}$ = 37.8); eyelid/IOD 86.5-127.3 ($\overline{X}$ = 101.6); E-N/eye 76.1-95.4 ($\overline{X}$ = 83.8).

Natural history: *E. gracilis* is primarily found on vegetation and dead sticks along the borders of covered streams in cloud forests at night. The species is known from cloud forests between 1680 and 2320 m in Departamentos Caldas, Quindío, and Valle del Cauca. On 19 June 1984, I sampled *Eleutherodactylus* from two streams at the type-locality (Peñas Blancas). I found three species of Eleutherodactylus (Table 1) in each stream following approximately 45 minutes of search time along each stream. Along the covered stream, *E. gracilis* was the most common from the viewpoints of total numbers as well as frequency. Very frequently, this species is found on dead twigs very near the surface of the water in dense vegetation. The animals appear to be especialy common in dense tangles of vegetation that one sometimes encounters in cloud forest streams.

The largest juvenile female is KU 132708 (29.2 mm SVL). The largest juvenile male is KU 132707 (19.7 mm SVL).

Eleutherodactylus gracilis is known from the eastern slopes of the Cordillera Occidental (type-locality and Valle del Silencio, Farallones de Cali, Municipio de Cali, 1680 m, Universidad del Valle, Cali, Museo de Historia Natural, colección herpetológica Nº 7310) and from the western slopes of the Cordillera Central (SE and ESE Villamaría in Caldas and from Hacienda Brillante, finca El Pencil, vereda San Julián, Municipio de Calarcá, Departamento del Quindío, 2030-2100 m, ICN 9085-9108.

Eleutherodactylus molybrignus sp. nov Figs. 3 (d), 5 (c-d)

Holotype: ICN Nº 7895, adult female, one of a series collected by John D. Lynch and Pedro M. Ruiz on 5 August 1980.

Paratypes: ICN 7896-914, 7917-47, topotypes collected with holotype; ICN 7915-16, 28-30 km by road NNW Uribe, Municipio El Tambo, Departamento del Cauca, 2250-2350 m; KU 168884-86, west slope Cerro Charquayaco, 38 kms NW (= NNW) Uribe, Depto. Cauca, 2240 m; KU 168887-905, Río Calima, 1.5 km by road W Lago Calima, Municipio de Restrepo, Departamento del Valle del Cauca, Colombia, 1230 m.

Type-locality: Quebrada Sopladero, 33 km by road NNW Uribe, Municipio de El Tambo, Departamento del Cauca, Colombia, 2190 m.

ETYMOLOGY: The specific epithet is derived from the Greek *molybros* (color of lead) and *ignya* (the concealed surfaces of the thighs) in reference to the coloration of these surfaces in life.

DIAGNOSIS: (1) skin of dorsum smooth anteriorly, becoming coarsely shagreened posteriorly, that of venter areolate; postocular folds on occiput; no dorsolateral folds; (2) tympanum absent; (3) snout relatively short, subacuminate in dorsal view, rounded in lateral profile; canthus rostralis evident, not sharp; (4) IOD broader than upper eyelid; small tubercles on upper eyelid; no cranial crests; (5) vomerine odontophores prominent, oval in outline; (6) males lack vocal slits and sac; thumbs of males bear non-spinous nuptial pads; (7) first finger shorter than second; digital pads large; (8) fingers bear narrow lateral keels; (9) no ulnar tubercles; (10) small tubercle on heel; very short inner tarsal fold; (11) two metatarsal tubercles, inner oval, 4-6 times size of conical outer; supernumerary plantar tubercles indistinct; (12) toes bear narrow lateral fringes, not webbed; (13) brown above with darker brown mottling; venter cream with small brown spots; posterior surfaces of thighs rusty-brown, spotted with cream or not; (14) adult males 21.3-29.3 ($\overline{X} = 26.9$, N = 35) mm, adult females 34.0-42.1 ($\overline{X} = 37.5$, N = 11) mm SVL.

Eleutherodactylus molybrignus is most similar to *E. gracilis* but differs in having an inner tarsal fold, small heel tubercle, more coarse skin on the dorsum, and in lacking the yellow or orange spots on the flanks and concealed surfaces of the limbs. *Eleutherodactylus molybrignus* can be distinguished from *E. bernali* because it lacks webbing between the toes (basal webs in *bernali*), has a less prominent inner tarsal fold, and lacks the tympanum (concealed in *bernali*).

DESCRIPTION: Head as wide as body, wider than long; snout subacuminate in dorsal view, rounded in lateral profile (Fig. 5); snout as long as eye, E-N less than eye length; nostrils not protuberant, directed dorsolaterally; canthus rostralis evident but not sharp, straight; loreal region slightly concave, sloping abruptly to lips; lips not flared; small, non-conical tubercles on upper eyelids; interorbital space flat, no cranial crests; supratympanic fold pustular, extending from eye to above insertion of arm; postrictal tubercles conical, not large; tympanum absent; choanae small, round, not concealed by palatal shelf of maxillary arch; vomerine odontophores large, median and posterior to choanae, oval in outline, separated medially by a distance less than ½ width of an odontophore, each 2-3 times size of a choana, bearing a tranverse row of 5-8 teeth; tongue longer than wide, its posterior border not notched (or only feebly notched), posterior 2/5 not adherent to floor of mouth; males lack vocal sac and slits.

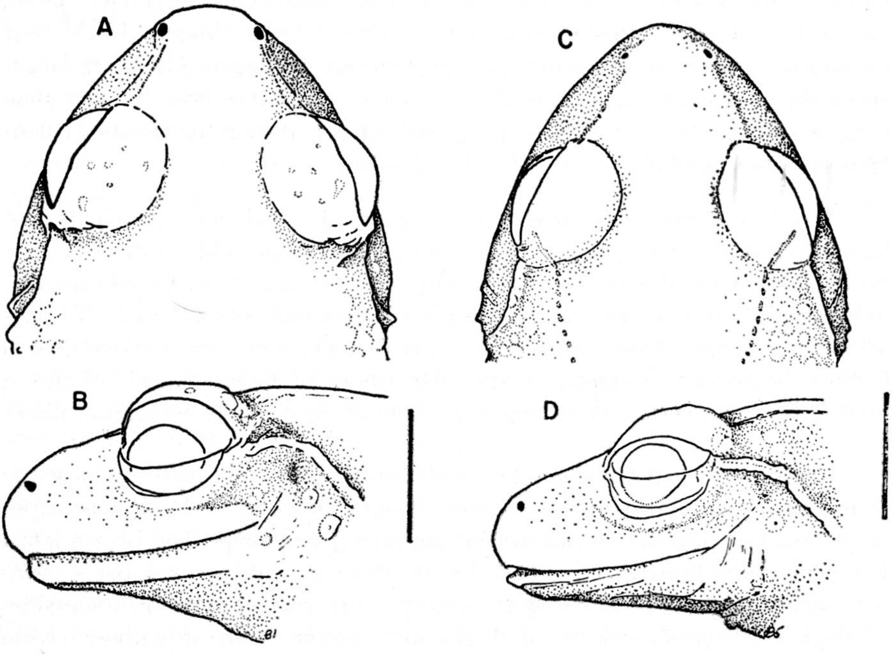

FIGURE 5. Heads of *Eleutherodactylus:* (A-B) *E. gracilis,* KU 132709, and (C-D) *E. molybrignus,* KU 168884. Scales equal 5 mm.

Skin on snout smooth except for a pair of tubercles anteromedial to eyes; rest of dorsum smooth or becoming roughened posteriorly (small, low warts or ridgelets); pair of postocular ridges on occiput, fading at about level of scapulae; warts most prominent on upper flanks and lateral to postocular ridges; no dorsolateral folds; skin on dorsal surfaces of forearm, and shank bearing a network of low, narrow ridges; no anal sheath or enlarged para-anal warts; skin of venter areolate, of throat smooth; discoidal folds prominent.

No ulnar tubercles; palmar tubercle bifid, much larger than oval thenar tubercle; supernumerary palmar tubercles low; subarticular tubercles round, moderately elevated; fingers bear narrow lateral keels; fingers II-IV bear expanded pads, rounded apically (almost truncate on fingers III-IV in larger specimens); pad of thumb scarcely expanded; all fingers bear broader than long discs on ventral surface of pad; first finger shorter than second; non-spinous white nuptial pads on thumbs of males.

Small, non-conical tubercle on heel; some individuals have poorly defined tubercles along outer edge of tarsus; short inner tarsal fold on distal 1/3 of tarsus just proximal to oval (twice as long as wide) inner metatarsal tubercle; indistinct supernumerary plantar tubercles at bases of toes III and IV; subarticular tubercles longer than wide, non-conical; toes bear narrow lateral fringes, broad pads (slightly smaller than those of finger); heels of flexed hind limbs just overlap when thighs are held at right angles to sagittal plane.

Cream to brown above mottled with brown (Fig. 3); pattern consisting of brown interorbital bar, brown marks along postocular folds, brown scapular and sacral chevrons, brown canthal-supratympanic stripe, and brown labial bars; limb bars brown, oblique on shanks, about as wide as interspaces; venter cream with small brown spots, slightly more concentrated on undersides of thighs; posterior surfaces of thighs dark brown, with or without cream flecks; no anal triangle; anterior surfaces of thighs brown, blotched with cream; most females have a pale area in groin (not evident in males-blotched with brown).

In life, *E. molybrignus* is yellowish, olive, brown, or reddish-brown above with darker markins; throat of males flesh-colored, of females pale rose; venter of males almost white, of females white stippled and spotted with brown; groin orange to red, spotted an reticulated with dark gray or not; some individuals have minute orange spots on the posterior surfaces of the thighs but in most specimens, the posterior surfaces of the thighs are dark gray or blue-gray densely flecked with black. The iris is bright copper with a brown horizontal streak and black reticulation. If dorsolateral stripes are present, the stripes are cream. In very small individuals, the venter is yellow.

DIMENSIONS OF HOLOTYPE IN MILLIMETERS: SVL 38.4; shank 19.8; HW 14.3; head length 13.6; chord of head length 15.4; upper eyelid width 3.5; IOD 3.4; eye length 5.2; E-N 4.3.

PROPORTIONS (IN PERCENTS): ♂♂ (N = 16) Shank/SVL 46.5-56.4 ($\bar{X}$ = 51.8); HW/SVL 35.6-39.9 ($\bar{X}$ = 37.1); eyelid/IOD 96.3-130.4 ($\bar{X}$ = 111.2); E-N/eye 69.8-89.7 ($\bar{X}$ = 80.0). ♀♀ (N = 11) Shank/SVL 49.2-58.4 ($\bar{X}$ = 53.6); HW/SVL 35.6-41-1 ($\bar{X}$ = 38.5); eyelid/IOD 85.0-134.5 ($\bar{X}$ = 104.2); E-N/eye 77.8-88.5 ($\bar{X}$ = 81.6).

NATURAL HISTORY: *E. molybrignus* is found on vegetation in forests along the borders of streams at night. The species is known only from the western flanks of the Cordillera Occidental and has a distribution pattern congruent with several other frogs (*Colostethus agilis, E. brevifroms,* and *E. viridicans,* among others). The largest juvenile female (ICN 7930) is 30.9 mm SVL.

DISCUSSION

The diversity of frogs of the genus *Eleutherodactylus* appears endless. However, in some areas (for example, the Amazon Basin and the Chocó) it appears that we have found the majority (or all) of the species because in recent collections we find the same series of species without encountering previously unknown ones (this does include a few species which have yet to be described). In páramos we still encounter new species because there are many isolated and semi-isolated páramos from which we lack adequate inventory collections. However, in the cloud forests, especially of Colombia, the diversity of this genus is very high. At present, I am aware of some 50 species from the cordilleras Central and Oriental that are undescribed. The Cordillera Occidental is almost unknown with the exception of the vicinity of Cali (however, this year a new species was found in an area throught "well-collected" in cloud forests some 15 km outside of the city). Fieldwork is more difficult in these forests perhaps because the habitat is more heterogeneous than that of the forests in the lowlands.

The four species named herein are grouped on the basis of general similarities. The four have the plesiomorphic condition of the route of the mandibular ramus of the trigeminal nerve through the adductor mandibular muscles (Lynch, 1986). At present, we do not have sufficient evidence to group them as a unit. Two *(E. gracilis* and *E. molybrignus)* are distinctive in lacking tympani, and the absence of this structure is rare in frogs in general (and among frogs of the genus *Eleutherodactylus*). The presence of a reduced (and hidden) tympanum in *E. bernali* and *E. diaphonus* contributes to the impression of similarity but is not significant (if one recognizes that evolutionary trends are but illusions).

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TABLE 1.

Collections of frogs of the genus *Eleutherodactylus* along two streams at Peñas Blancas, Valle del Cauca, on 19 June 1984.

SPECIES	covered stream	open (not covered) stream
E. erythropleurus	0	1
E. gracilis	19	7
E. w-nigrum	2	4
E. Sp.[1]	1	0

[1] This species is not described; it is found at several sites in cloud forests in the Cordillera Occidental in Valle del Cauca. Superficially, it resembles a small *E. latidiscus*.